Number of Amphibians and Reptiles Using the Floodplain

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| Expectation: | Within two years following establishment of a wetland plant community, at least 27 amphibian and reptile taxa will be found in restored broadleaf marsh habitats currently characterized as pasture. |
| Author(s): | Joseph W. Koebel Jr., South Florida Water Management District |
| Date: | July 20, 1998 |
| Relevant Endpoint(s): | Restoration - Biological Integrity - Community Structure<br>Restoration – Biological Integrity – Biodiversity<br>Restoration – System Functional Integrity - Habitat Quality<br>Restoration – System Functional Integrity – Habitat Use |
| Baseline Conditions: | Visual encounter surveys (VES), casual observation (visual and aural), and throwtrap were used to describe herpetofaunal characteristics in pasture habitats of Pools A and C. Numbers in parentheses indicate total number of individuals observed (visually or aurally) or captured. L = Larvae<br><br>Data indicate the absence or infrequent occurrence of amphibians and reptiles in pasture habitats. Eight species including *Hyla cinerea* (9), *Gastrophryne carolinensis* (7), *Psuedobranchus axanthus axanthus* (5L), *Rana sphenocephala* (1), *Pseudacris ocularis* (1), *Anolis carolinensis* (2), *Siren lacertina* (1L) and *Coluber constrictor* (1) were identified along visual encounter survey (VES) transects, casually observed, or captured in a throwtrap in Pool A pasture. Three species including *H. cinerea* (2), *G. carolinensis* (1), and *R. sphenocephala* (1), were identified along pasture VES transects, casually observed, or captured in a throwtrap in Pool C pasture. |
| Reference Conditions: | Historical data on amphibian and reptile abundance and distribution from the Kissimmee River ecosystem are limited. Locality records and distribution maps for amphibians and reptiles from counties adjacent the Kissimmee River have been compiled by Bachmann (1996), and provide some information on species composition. Carr (1940) presents a comprehensive review of amphibian and reptile habitat distributions throughout Florida, and lists species that are characteristic, frequently occur, or are occasional within each habitat. Carr and Goin (1955) also present the general distribution, Florida range, and habitat characteristics of the herpetofauna of Florida. More recently, Auffenberg (1981) has categorized Florida's environment and, for each environmental type, describes vegetation and dominant and indicator species of amphibians and reptiles. Additionally, Auffenberg (1982) discusses patterns of distribution of the Florida herpetofauna including a brief discussion of the fauna of the Lake Wales Ridge and Kissimmee Prairie. Habitats listed by Carr (1940), Carr and Goin (1955), and Auffenberg (1981) roughly coincide with those described by Toth et al. (1995) and should be useful in predicting what species likely occurred within specific habitats of the pre-channelized Kissimmee ecosystem. The expectation of at least 27 taxa occurring in restored broadleaf marsh represents approximately 77% of taxa characteristic, or frequently occurring in freshwater marshes of Florida (Table 1), and represents a 900% increase over the number of wetland taxa currently |

present within pasture habitat in Pool C (J.W. Koebel Jr., unpublished data). Species occurrences are based on Carr (1940), Carr and Goin (1950), Auffenberg (1981, 1982), Conant and Collins (1991), Tennant (1997), and Bartlett and Bartlett (1999).

Mechanism for Achieving Expectation:

Re-establishing a full range of hydrologic variation within floodplain pasture habitats including floodplain hydroperiod and variable depth patterns will be the impetus for re-establishment of broadleaf marsh vegetation and an aquatic invertebrate community necessary for colonization and persistence of amphibians and reptiles. Adult colonists likely will emigrate from existing wetland depressions within the pasture, or from the rivers' littoral zone. Colonization by larval amphibians also may occur from wetland depressions and littoral areas.

Adjustments for External Constraints:

It is unlikely that any species of amphibian or reptile was extirpated following channelization. However, in the event of prolonged drought or other habitat-altering event (e.g., fire), amphibians and reptiles are likely to emigrate to more suitable habitat. The absence of herpetofauna from broadleaf marsh habitats during these periods should be viewed as temporal variability within the system, and not an indication that the expectation has not been achieved.

Means of Evaluation:

VES, larval amphibian sampling (throwtrap), and casual observations (visual and aural) will commence approximately 6 - 12 months following implementation of the interim upper basin regulation schedule, assuming that stage elevations within Pool C are sufficient to re-inundate floodplain habitats. Methods will be identical to those outlined in Donnelly et al. (1998) and Koebel et al. (2001, in preparation), and include monthly sampling of replicate (9) VES transects and monthly, replicate (10) throwtrap samples from randomly selected locations within pasture habitat of Pool A and restored broadleaf marsh habitat, currently characterized as pasture, in Pool C. Surveys and samples will be analyzed for species identity, species richness, and the presence of indicator species. A species accumulation curve will be developed after the first monthly sampling event, and updated following each additional sampling event to determine whether the restoration expectation has been achieved.

Time Course for Restoration:

The time frame for reestablishing historic inundation frequencies will be dependent on a number of factors. Initially, inundation patterns will be dictated by construction activities. During the initial construction phase, it is unlikely that stage elevations within Pool C will be sufficient to inundate pasture habitat for an extended period of time. A stage sufficient to inundate pasture is likely once the interim upper basin regulation schedule is implemented (approximately November 2001).

After appropriate hydrologic conditions are established it is likely that wetland plant species will become established within 1 - 2 years. Results of the Demonstration Project (Toth 1993) indicate colonization of wetland plant species on re-inundated floodplain can be rapid. Aquatic invertebrates also should respond quickly to re-established hydroperiod, with representative densities of macroinvertebrates occurring within one to three years following inundation.

Restoration of amphibian and reptile community structure within restored broadleaf marsh habitat also is likely to be rapid. It is likely that the accumulation of amphibian and reptile species will reach the stated expectation within two years following re-establishment of historic broadleaf marsh vegetation.

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Table 1: Potential indicator species for assessing restoration of amphibian and reptile community structure in reestablished broadleaf marsh habitats (Carr 1940; Conant and Collins 1991; Tennant 1997; Bartlett and Bartlett 1999).

Indicator Species
*Acris gryllus* (Southern Cricket Frog)
*Gastrophryne carolinensis* (Narrow-mouthed Toad)
*Hyla cinerea* (Green Tree Frog)
*Hyla femoralis* (Pine Woods Tree Frog)
*Hyla gratiosa* (Barking Tree Frog)
*Hyla squirella* (Squirrel Tree Frog)
*Pseudacris ocularis* (Little Grass Frog)
*Rana catesbeiana* (Bullfrog)
*Rana grylio* (Pig Frog)
*Rana sphenocephala* (Southern Leopard Frog)
*Eurycea quadridigitata* (Dwarf Salamander)
*Notophthalmus viridescens piaropicola* (Peninsular Newt)
*Amphiuma means* (Two-toed Amphiuma)
*Pseudobranchus axanthus axanthus* (Narrow-striped Dwarf Siren)
*Siren intermedia* (Lesser Siren)
*Siren lacertina* (Greater Siren)
*Alligator mississippiensis* (American Alligator)
*Anolis carolinensis* (Green Anole)
*Agkistrodon piscivorous* (Eastern Cottonmouth)
*Farancia abacura* (Eastern Mud Snake)
*Lampropeltis getula floridana* (Florida Kingsnake)
*Nerodia fasciata pictiventris* (Florida Water Snake)
*Nerodia floridana* (Florida Green Water Snake)
*Nerodia taxispilota* (Brown Water Snake)
*Regina alleni* (Striped Crayfish Snake)
*Seminatrix pygaea cyclas* (South Florida Swamp Snake)
*Sistrurus miliarius barbouri* (Dusky Pigmy Rattlesnake)
*Storeria dekayi victa* (Florida Brown Snake)
*Thamnophis sauritus* (Eastern Ribbon Snake)
*Chelydra serpentina osceola* (Florida Snapping Turtle)
*Deirochelys reticularia chrysea* (Florida Chicken Turtle)
*Kinosternon baurii* (Striped Mud Turtle)
*Kinosternon subrubrum steindachneri* (Florida Mud Turtle)